Complete Summary

GUIDELINE TITLE

Liver biopsy.

BIBLIOGRAPHIC SOURCE(S)

Rockey DC, Caldwell SH, Goodman ZD, Nelson RC, Smith AD, American Association for the Study of Liver Diseases. Liver biopsy. Hepatology 2009 Mar;49(3):1017-44. [214 references] PubMed

GUIDELINE STATUS

This is the current release of the guideline.

COMPLETE SUMMARY CONTENT

SCOPE

DISEASE/CONDITION(S)

Liver disease

Note: This guideline deals exclusively with liver biopsy as it relates to adult liver disease.

GUIDELINE CATEGORY

Diagnosis
Management

CLINICAL SPECIALTY

Gastroenterology
Internal Medicine
Pathology
Radiology

INTENDED USERS

Physicians

GUIDELINE OBJECTIVE(S)

To summarize the current practice of liver biopsy and make recommendations about its performance

TARGET POPULATION

Adult patients with liver disease

INTERVENTIONS AND PRACTICES CONSIDERED

Diagnosis/Management

Liver biopsy that includes:

1. Patient education about liver disease, and risks and benefits of the procedure; obtaining written informed consent
2. Prebiopsy testing (e.g., complete blood count, prothrombin time/international normalized ratio [PT/INR])
3. Management of medications (discontinuation and restarting of antiplatelet and anticoagulant medications)
4. Use of sedatives and frequent monitoring of vital signs
5. Ultrasound guidance and marking of optimal biopsy site
6. Obtaining adequate biopsy specimen
7. Two to four hours observation after biopsy
8. Management of complications

MAJOR OUTCOMES CONSIDERED

- Effectiveness of liver biopsy
- Complications of liver biopsy

METHODOLOGY

METHODS USED TO COLLECT/SELECT EVIDENCE

Hand-searches of Published Literature (Primary Sources)
Hand-searches of Published Literature (Secondary Sources)
Searches of Electronic Databases

DESCRIPTION OF METHODS USED TO COLLECT/SELECT THE EVIDENCE

These guidelines are based on the following: (1) formal review and analysis of the recently published world literature on the topic; (2) the American College of Physicians Manual for Assessing Health Practices and Designing Practice Guidelines; (3) guideline policies, including the American Association for the Study of Liver Diseases (AASLD) Policy on the Development and Use of Practice Guidelines and the American Gastroenterological Association Policy Statement on Guidelines; and (4) the experience of the authors in the specified topic.

NUMBER OF SOURCE DOCUMENTS

Not stated

METHODS USED TO ASSESS THE QUALITY AND STRENGTH OF THE EVIDENCE

Weighting According to a Rating Scheme (Scheme Given)

RATING SCHEME FOR THE STRENGTH OF THE EVIDENCE

Levels of Evidence

Level A Data derived from multiple randomized clinical trials or meta-analyses

Level B Data derived from a single randomized trial, or nonrandomized studies

Level C Only consensus opinion of experts, case studies, or standard-of-care

METHODS USED TO ANALYZE THE EVIDENCE

Systematic Review with Evidence Tables

DESCRIPTION OF THE METHODS USED TO ANALYZE THE EVIDENCE

Not stated

METHODS USED TO FORMULATE THE RECOMMENDATIONS

Expert Consensus

DESCRIPTION OF METHODS USED TO FORMULATE THE RECOMMENDATIONS

Not stated

RATING SCHEME FOR THE STRENGTH OF THE RECOMMENDATIONS

Grading System for Recommendations

Class I Conditions for which there is evidence and/or general agreement that a given diagnostic evaluation, procedure or treatment is beneficial, useful, and effective

Class II Conditions for which there is conflicting evidence and/or a divergence of opinion about the usefulness/efficacy of a diagnostic evaluation, procedure, or treatment

Class IIa Weight of evidence/opinion is in favor of usefulness/efficacy

Class IIb Usefulness/efficacy is less well established by evidence/opinion

Class III Conditions for which there is evidence and/or general agreement that a diagnostic evaluation, procedure/treatment is not useful/effective and in some cases may be harmful

COST ANALYSIS

Cost-effectiveness analyses have suggested that routine ultrasound (US) guidance in clinical practice may reduce the cost of liver biopsy (although as would be expected, this depends on the cost of US).

METHOD OF GUIDELINE VALIDATION

Peer Review

DESCRIPTION OF METHOD OF GUIDELINE VALIDATION

This position paper has been approved by the American Association for the Study of Liver Diseases (AASLD) and represents the position of the association. This guideline was produced in collaboration with the Practice Guidelines Committee of the AASLD which provided extensive peer review of the manuscript.

RECOMMENDATIONS

MAJOR RECOMMENDATIONS

The grading system for the class of recommendations (I, II, IIa, IIb, III) and the levels of evidence (A–C) are defined at the end of the "Major Recommendations" field.

Indications for Liver Biopsy

1. Liver biopsy should be considered in patients in whom diagnosis is in question, and when knowledge of a specific diagnosis is likely to alter the management plan **(Class I, Level B)**.
2. Liver histology is an important adjunct in the management of patients with known liver disease, particularly in situations where (prognostic) information about fibrosis stage may guide subsequent treatment; the decision to perform

liver biopsy in these situations should be closely tied to consideration of the risks and benefits of the procedure **(Class I, Level B**).

Preparation for Liver Biopsy

3. Prior to performance of liver biopsy, patients should be educated about their liver disease and about investigations other than liver biopsy (if any) that may also provide diagnostic and prognostic information **(Class I, Level C)**.
4. Prior to performance of liver biopsy, patients must be carefully informed about the procedure itself including alternatives (as above), risks, benefits, and limitations; written informed consent should be obtained **(Class I, Level C)**.

Management of Medications

5. Antiplatelet medications should be discontinued several to 10 days before liver biopsy, although there is uncertainty surrounding the need for their discontinuation. Management of specific compounds should be handled on a case-by-case basis, taking into account their clinical indications, as well as the potential bleeding risk associated with their use in the setting of liver biopsy **(Class I, Level C)**.
6. Anticoagulant medications should be discontinued prior to liver biopsy. Warfarin should generally be discontinued at least 5 days prior to liver biopsy. Heparin and related products should be discontinued 12 to 24 hours prior to biopsy. In all patients, the risk of discontinuing anticoagulant medications must be weighed against the (potential) risk of bleeding during/after liver biopsy **(Class I, Level C)**.
7. Antiplatelet therapy may be restarted 48 to 72 hours after liver biopsy **(Class I, Level C)**.
8. Warfarin may be restarted the day following liver biopsy **(Class I, Level C)**.

Liver Biopsy Procedure

9. Performance of liver biopsy requires an adequate sized and dedicated physical space suitable for focused physician effort as well as safe patient recovery **(Class I, Level C)**.
10. The use of sedation, preferably light sedation, is safe and does not lead to increased procedural risk **(Class IIb, Level B)**.
11. Vital signs must be frequently monitored (at least every 15 minutes for the first hour) after liver biopsy **(Class I, Level C)**.
12. The recommended observation time after biopsy is between 2 to 4 hours and will vary depending on local expertise and practice **(Class I, Level B)**.

Ultrasound Guidance

13. Ultrasound guidance with marking of the optimal biopsy site performed immediately preceding biopsy, by the individual performing the biopsy, is preferred, though not mandatory, because it likely reduces the risk of complications from liver biopsy **(Class I, Level B)**. (See also recommendations 24 and 34)

Contraindications

14. Percutaneous liver biopsy with or without image guidance is appropriate only in cooperative patients, and this technique should not be utilized in uncooperative patients **(Class I, Level C)**.
15. Uncooperative patients who require liver biopsy should undergo the procedure under general anesthesia or via the transvenous route **(Class I, Level C)**.
16. In patients with clinically evident ascites requiring a liver biopsy, a transvenous approach is
generally recommended, although percutaneous biopsy (after removal of ascites) or laparoscopic biopsy are acceptable alternatives **(Class I, Level C)**.
17. Patients who require liver biopsy and who have a large vascular lesion identified on imaging should undergo the procedure using real-time image guidance **(Class I, Level C)**.
18. The decision to perform liver biopsy in the setting of abnormal laboratory parameters of hemostasis should continue to be reached as the result of local practice(s) and consideration of the risks and benefits of liver biopsy because there is no specific PT-INR and/or platelet count cutoff at or above which potentially adverse bleeding can be reliably predicted **(Class I, Level C)**.

Complications

19. Those performing liver biopsy must be cognizant of multiple potential complications (including death) that may occur after liver biopsy and discuss these appropriately with their patients beforehand **(Class I, Level C)**.
20. Platelet transfusion should be considered when levels are less than 50,000-60,000/mL (this applies whether one is attempting biopsy transcutaneously or transvenously) **(Class I, Level C)**.
21. The use of prophylactic or rescue strategies such as plasma, fibrinolysis inhibitors, or recombinant factorsÂ should be considered in specific situations, althoughÂ their effectiveness remains to be established **(Class IIa, Level C)**.
22. In patients with renal failure or on hemodialysis, desmopressin (DDAVP) may be considered, although its use appears to be unnecessary in patients on stable dialysis regimens **(Class IIa, Level B)**.
23. Patients on chronic hemodialysis should be well dialyzed prior to liver biopsy, and heparin should be avoided if at all possible **(Class I, Level C)**.

Radiological Considerations

24. Image-guided liver biopsy is recommended in certain clinical situations including in patients with known intrahepatic lesions (real-time imaging is strongly preferred) and in those with previous intra-abdominal surgery who may have adhesions. Image-guided liver biopsy should also be considered in the following situations: patients with small livers that are difficult to percuss, obese patients, and patients with clinically evident ascites **(Class I, Level C)**.

Pathological Considerations

25. Because diagnosis, grading, and staging of non-neoplastic, diffuse parenchymal liver disease is dependent on an adequate sized biopsy, a biopsy

of at least 2-3 cm in length and 16-gauge in caliber is recommended **(Class I, Level C)**.

26. It is recommended that if applicable, the presence of fewer than 11 complete portal tracts be noted in the pathology report, with recognition that diagnosis, grading, and staging may be incorrect due to an insufficient sample size **(Class I, Level C)**.
27. If cirrhosis is suspected, a cutting rather than a suction needle is recommended **(Class I, Level B)**.
28. In clinical practice, use of a simple (e.g., Metavir or Batts-Ludwig) rather than complex (e.g., Ishak) scoring system is recommended **(Class I, Level C)**.

Noninvasive Alternatives to Liver Biopsy

29. Liver biopsy is currently a fundamentally important tool in the management of patients with liver disease, important for diagnosis as well as staging of liver disease and its use is recommended until clearly superior methodologies are developed and validated **(Class IIb, Level C)**.

Training for Liver Biopsy

30. Specific training for liver biopsy is essential and is recommended for those who perform it **(Class I, Level C)**.
31. Liver biopsy should be taught to trainees by experts, highly experienced in the practice of liver biopsy and management of its potential complications **(Class I, Level C)**.
32. Although the number of biopsies required to become adequately trained is unknown, it is recommended that operators perform at least 40 biopsies **(Class I, Level C)**.
33. Training in percutaneous liver biopsy should include specific training in ultrasound interpretation of fundamental liver anatomy and other landmarks **(Class I, Level C)**.
34. Image-guided liver biopsy should be taught to trainees by experts who themselves have adequate training and experience with the technique **(Class I, Level C)**.

Definitions

Levels of Evidence*

Level A Data derived from multiple randomized clinical trials or meta-analyses

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Level C Only consensus opinion of experts, case studies, or standard-of-care

Grading System for Recommendations*

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*Adapted from the American College of Cardiology and the American Heart Association Practice Guidelines.

CLINICAL ALGORITHM(S)

None provided

EVIDENCE SUPPORTING THE RECOMMENDATIONS

TYPE OF EVIDENCE SUPPORTING THE RECOMMENDATIONS

The guidelines are based on review of the published literature and the personal experience of the authors. The type of evidence is specifically stated for each recommendation (see the "Major Recommendations" field).

BENEFITS/HARMS OF IMPLEMENTING THE GUIDELINE RECOMMENDATIONS

POTENTIAL BENEFITS

Appropriate performance of liver biopsy

POTENTIAL HARMS

Complications of Liver Biopsy

- *Pain*: Pain is the most common complication of percutaneous liver biopsy, occurring in up to 84% of patients, including those with relatively mild discomfort. Pain may be more common in those with a history of narcotic dependence but does not appear to be related to approach (i.e., subcostal versus intercostal). Moderate to severe pain is seen in only a small proportion of patients and should raise the possibility of a complication such as bleeding or gall bladder puncture.
- *Bleeding*: The most important complication of liver biopsy is bleeding, which, when severe, occurs intraperitoneally. Severe bleeding is defined clinically (heralded by a change in vital signs with radiographic evidence of intraperitoneal bleeding) and requires hospitalization, the likelihood of transfusion, or even radiological intervention or surgery. Such bleeding has been estimated to occur in between 1 in 2500 to 1 in 10,000 biopsies after an

intercostal percutaneous approach for diffuse, nonfocal, liver disease.Â Less severe bleeding, defined as that sufficient to cause pain or reduced blood pressure or tachycardia, but not requiring transfusion or intervention, occurs in approximately 1 in 500 biopsies. Severe bleeding is usually clinically evident within 2-4 hours, but late hemorrhage can occur even up to one week after biopsy.

- *Death*: Mortality after liver biopsy is usually related to hemorrhage. It is very uncommon after percutaneous biopsy, but precise figures vary widely in the literature. Death due to bleeding may also be greater after biopsy of malignant lesions than in patients with diffuse parenchymal disease. The most commonly quoted mortality rate is less than or equal to 1 in 10,000 liver biopsies.
- *Miscellaneous*: A number of other complications have been reported after liver biopsy. These include pneumothorax, hemothorax, perforation of any of several viscous organs, bile peritonitis, infection (bacteremia, abscess, sepsis), hemobilia, neuralgia, and rare complications such as ventricular arrhythmia with transvenous biopsy.

Pitfalls of Liver Biopsy

Sampling variability appears to be one of the major limitations of liver biopsy.

CONTRAINDICATIONS

CONTRAINDICATIONS

Contraindications to Percutaneous Liver Biopsy

Absolute

- Uncooperative patient
- Severe coagulopathy
- Infection of the hepatic bed
- Extrahepatic biliary obstruction

Relative

- Ascites
- Morbid obesity
- Possible vascular lesions
- Amyloidosis
- Hydatid disease

QUALIFYING STATEMENTS

QUALIFYING STATEMENTS

These recommendations suggest preferred approaches to the diagnostic, therapeutic, and preventive aspects of care. They are intended to be flexible, in

contrast to standards of care, which are inflexible policies to be followed in every case.

IMPLEMENTATION OF THE GUIDELINE

DESCRIPTION OF IMPLEMENTATION STRATEGY

An implementation strategy was not provided.

IMPLEMENTATION TOOLS

Personal Digital Assistant (PDA) Downloads

For information about availability, see the "Availability of Companion Documents" and "Patient Resources" fields below.

INSTITUTE OF MEDICINE (IOM) NATIONAL HEALTHCARE QUALITY REPORT CATEGORIES

IOM CARE NEED

Getting Better
Living with Illness

IOM DOMAIN

Effectiveness

IDENTIFYING INFORMATION AND AVAILABILITY

BIBLIOGRAPHIC SOURCE(S)

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ADAPTATION

Not applicable: The guideline was not adapted from another source.

DATE RELEASED

2009 Mar

GUIDELINE DEVELOPER(S)

American Association for the Study of Liver Diseases - Private Nonprofit Research Organization

SOURCE(S) OF FUNDING

American Association for the Study of Liver Diseases

GUIDELINE COMMITTEE

American Association for the Study of Liver Diseases (AASLD) Practice Guidelines Committee

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FINANCIAL DISCLOSURES/CONFLICTS OF INTEREST

Potential conflict of interest: Nothing to report.

GUIDELINE STATUS

This is the current release of the guideline.

GUIDELINE AVAILABILITY

Electronic copies: Available in Portable Document Format (PDF) from the American Association for the Study of Liver Diseases Web site.

Print copies: Available from the American Association for the Study of Liver Diseases, 1729 King Street, Suite 200; Alexandria, VA 22314; Phone: 703-299-9766; Web site: www.aasld.org; e-mail: aasld@aasld.org.

AVAILABILITY OF COMPANION DOCUMENTS

This guideline is available as a Personal Digital Assistant (PDA) download via the APPRISOR™ Document Viewer from www.apprisor.com.

PATIENT RESOURCES

None available

NGC STATUS

This summary was completed by ECRI Institute on December 31, 2009. The information was verified by the developer on January 20, 2010.

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